

Child Care Ratios											
Title	Author(s)	Year	Publication Source	Sample Size (N)	Sample Composition	Data Source	Independent Variable(s)	Dependent Variable(s)	Summary of Findings	Limitations to Causal Inference	Exclusion Criteria
Illness associated with child day care: A study of incidence and cost	Bell, D., Gleiber, D., Mercer, A., Phiher, R., Gunter, R., Cohen, J., Epstein, E., Narayanan, M.	1989	<i>American Journal of Public Health</i>	843	843 children less than 36 months old in Memphis, Tennessee	Health care utilization data from prepaid plan	<ul style="list-style-type: none"> Child care type Group size 	<ul style="list-style-type: none"> Incidence of illness Incidence of hospitalizations 	<ul style="list-style-type: none"> The study found an increase in total number of infections for children in day care centers compared to children cared for in their own homes. Children in day care centers were more likely to be hospitalized than those in other settings. 	Observational; Geography is not necessarily representative	
The effect of child care characteristics on child development	Blau, D.	1999	<i>The Journal of Human Resources</i>	621 to 4,031 (varied by outcome)	Children of female participants in 1979 National Longitudinal Survey of Youth - began with sample of 12,652 people who were age 14 to 21 in 1979	National Longitudinal Survey of Youth, begun in 1979 following those who were 14-21 in 1979	<ul style="list-style-type: none"> Child to caregiver ratio, group size 	<ul style="list-style-type: none"> Math (PIAT-Math) Literacy (PPVT) Behavioral (BPI) assessments 	<ul style="list-style-type: none"> Overall, the study found null effects of ratios on child outcomes for infants and toddlers as measured by math, literacy, and behavioral assessments. This result held when the author controlled for mother fixed effects, race/ethnicity, and poverty. The author concluded that ratios and group sizes do not significantly predict child outcomes. 		
A meta-analysis of class sizes and ratios in early childhood education programs: Are thresholds of quality associated with greater impacts on cognitive, achievement, and socioemotional outcomes?	Bonnes Bowne, J., Magnuson, K., Schindler, H., Duncan, G., Yoshikawa, H.	2017	<i>Educational Evaluation and Policy Analysis</i>	38 studies	38 studies with 328 effect sizes (270 effect sizes for cognitive outcomes and 58 for social-emotional and behavioral outcomes) on early childhood programs for students ages 3-5 with at least 10 hours of care per week for at least 4 months	Comprehensive database of US early childhood education program evaluations published between 1960 and 2007	<ul style="list-style-type: none"> Child to caregiver ratio 	<ul style="list-style-type: none"> Effect sizes of children's cognitive, achievement Effect sizes of children's social-emotional outcomes 	<ul style="list-style-type: none"> This study found that ratios under 7.5:1 and class sizes of 15 or fewer children were associated with small improvements in cognitive outcomes for children, but changes in ratios and class sizes above those low thresholds did not make a difference. There were insufficient effect sizes available to draw a clear conclusion about social-emotional outcomes. 		Examines ages 3-5 rather than 0-3
Quality of center child care and infant cognitive and language development	Burchinal, M., Roberts, J., Nabors, L., Bryant, D.	1996	<i>Child Development</i>	79	79 African American 12-month olds	Scores on the Bayley Scales of Infant Development and Sequenced Inventory of Communication Development; collected from interviews and observations	<ul style="list-style-type: none"> Child to caregiver ratio 	<ul style="list-style-type: none"> Cognitive development Language development Communication skills 	<ul style="list-style-type: none"> The study found that lower ratios were associated with better communication skills for infants when controlling for a variety of child and family factors. Children in rooms with a ratio of 3 infants to 1 adult or lower scored above infants in classes that did not meet this ratio. 	Small sample size; cross-sectional (at 12 months old)	

Child Care Ratios											
Title	Author(s)	Year	Publication Source	Sample Size (N)	Sample Composition	Data Source	Independent Variable(s)	Dependent Variable(s)	Summary of Findings	Limitations to Causal Inference	Exclusion Criteria
Structural predictors of child care quality in child care homes	Burchinal, M., Howes, C., Kontos, S.	2002	<i>Early Childhood Research Quarterly</i>	226 families in the family child care study, and 100 providers in the California licensing study	Families were recruited if they had a child under 6, a mother who worked at least 15 hours per week, and if their major form of care was family child care, including care by a relative. For the licensing study, participation was limited to family child care homes that enrolled infant, toddler, or preschool-age children as well as school-age children. Family child care homes were included only if they initially enrolled six children and planned to add one or two children, or if they initially enrolled 12 children and planned to add one or two children.	Family Child Care and Relative Care Study (FCC study) and the California licensing study	<ul style="list-style-type: none"> Child to caregiver ratio Group size Caregiver background 	<ul style="list-style-type: none"> Caregiver involvement Overall quality 	<ul style="list-style-type: none"> Caregiver training, not ratio, was most consistently predictive of child care quality. Quality of care was not found to be predicted by child care homes meeting professional standards for age-weighted group size or ratio. 	Observational, small sample size, little variation in group size/ratios in homes	
Examining the black-white achievement gap among low-income children using the NICHD study of early child care and youth development	Burchinal, M., Steinberg, L., Friedman, S., Pianta, R., McCartney, K., Crosnoe, R., McLoyd, V., and the NICHD Early Child Care Research Network	2011	<i>Child Development</i>	314	Black and White children with similar low income from 10 sites that participated in the NICHD study of Early Child Care and Youth Development	Longitudinal data sets from the National Longitudinal Survey of Youth, the Early Childhood Longitudinal Study, Birth and Kindergarten cohorts	<ul style="list-style-type: none"> A number of structural features of classroom quality, including ratios 	<ul style="list-style-type: none"> Reading and math scores from 54 months through 5th grade 	<ul style="list-style-type: none"> The authors found that Black children had higher math skills with lower ratios, and showed bigger gains over time with lower ratios. These findings did not hold for White children. 		No infants/toddlers (began at 4.5 years old)
Child care ratios in Texas and children's safety	Child and Family Research Partnership, LBJ School of Public Affairs, University of Texas at Austin	2018	University of Texas	353 centers	Representatives from the Child Care Licensing (CCL) Division of the Texas Department of Family and Protective Services (DFPS)	Surveys	<ul style="list-style-type: none"> Whether a center met/exceeded minimum standards for ratios 	<ul style="list-style-type: none"> Reports of injury Reports of supervision deficiency 	<ul style="list-style-type: none"> The study found that child care centers that exceeded licensing standards for ratios (better than the standard) were significantly less likely to have serious incident reports. Centers with zero ratio citations had significantly fewer incident reports than centers with at least one ratio citation. 	Correlational, did not aim to make causal link	
Predicting process quality from structural quality in preschool programs: A cross-country comparison	Cryer, D., Tietze, W., Burchinal, M., Leal, T., Palacios, J.	1999	<i>Early Childhood Research Quarterly</i>	288 centers from the United States, 82 from Germany, 55 from Spain, and 80 from Portugal (n for children not given)	505 preschool classrooms in 4 countries	Interviews and surveys	<ul style="list-style-type: none"> Child to caregiver ratio 	<ul style="list-style-type: none"> Process quality Adult-child interaction quality 	<ul style="list-style-type: none"> The study found that a variety of aspects of structural quality contribute to process quality; no one structural feature was a consistently powerful predictor. It found that the US had the lowest ratios, whereas European countries emphasize teacher characteristics such as training rather than low ratios. Overall, child care quality was found to be poor when measured using ECERS scores. 		No infants/toddlers (3-5 only), many non-US observations

Child Care Ratios											
Title	Author(s)	Year	Publication Source	Sample Size (N)	Sample Composition	Data Source	Independent Variable(s)	Dependent Variable(s)	Summary of Findings	Limitations to Causal Inference	Exclusion Criteria
Effects of child-caregiver ratio on the interactions between caregivers and children in child-care centers: An experimental study	de Schipper, E., Riksen-Walraven, M., Geurts, S.	2006	<i>Child Development</i>	217 caregivers from 64 child care centers (no n for children given)	All child care centers in 2 cities in the Netherlands were called and asked to participate. The sample of caregivers was 95% white and average age was 31.2 years. All caregivers were female.	The address locator from a child-care website and telephone books; if they agreed to participate, data came from surveys and observations	• Child to caregiver ratio	• Child care process quality • Caregiver behavior	• Child to caregiver ratios of 3 to 1 were associated with significantly higher classroom quality than ratios of 5 to 1, particularly for younger children.	Very small sample size, non-US	
Ratio and group size in day care programs	Dunn, L.	1993	<i>Child and Youth Care Forum</i>	18 studies	Literature review examining studies on ratios and group size	Data from 18 studies	• Child to caregiver ratio • Group size	• Process quality • Children's developmental outcomes	• Group size was a stronger predictor of development than ratio. The review concluded that both features explain only a small portion of the variance in children's development.	Literature review	
The context of infant attachment in family child care	Elicker, J., Fortner-Wood, C., Noppe, I.	1999	<i>Journal of Applied Developmental Psychology</i>	41 toddlers (10-21 months old), 41 primary caregivers (39 mothers, 1 father, 1 grandmother) and 23 caregivers in family child care homes	All licensed or registered family child care providers in 8 counties in the upper Midwest	All licensed or registered family child providers in an 8-county urban and rural area in the upper Midwest of the United States were contacted by phone; if agreed to participate - observational visits.	• Child to caregiver ratio • Group size	• Quality of involvement • Attachment security with care providers	• The study did not find ratio to be a direct or indirect predictor of attachment security or quality of involvement. Group size was found to be an indirect predictor of attachment	Small sample size; observational	
The relationship of day care quality to children's free-play behavior and social problem-solving skills	Holloway, S., Reichhart-Erickson, M.	1988	<i>Early Childhood Research Quarterly</i>	55	55 children attending 15 day care centers	Observations (Early Childhood Observation Instrument or ECOI)	• Child to caregiver ratio	• Day care quality	• Ratio was found to be associated with small behavioral differences. For example, children in classes with more children to adults spent less time in solitary play and more time alone daydreaming. Ratio did not impact social behavior, either pro-social or anti-social, or social problem solving.	Small sample size	4 year-olds (not infants and toddlers)
Caregiver behavior in center and family day care	Howes, C.	1983	<i>Journal of Applied Developmental Psychology</i>	40	40 toddlers (20 in day care centers; 20 in family day care) and their caregivers. All of the caregivers were women and two-thirds were White.	Data provided by state licensing agencies	• Child to caregiver ratio	• Quality interactions	• Child to caregiver ratio and caregiver training were the strongest indicators of quality in centers, while safety and small group size were the strongest predictors of quality in family day care centers.	Small sample size, correlational	
Can the age of entry and the quality of infant child care predict behaviors in kindergarten?	Howes, C.	1990	<i>Developmental Psychology</i>	80	80 middle-class children who had participated in a previous study on family and infant child-care influences on children's compliance	Parent ratings, teacher ratings (e.g., the Achenbach Child Behavior Checklist, the Classroom Behavior Inventory)	• Quality of infant/toddler care (not disaggregated) • High quality centers had ratios of 1:3-1:4 for 2 year-olds and under & 1:6-1:7 for older children	• Social adjustment	• The study found that day care attendance was not as predictive of later outcomes as was the qualitative experience of children in the day care setting. For children who enrolled after 12 months, family socialization was most correlated with later outcomes, whereas for children who enrolled before 12 months old, teacher socialization was most important.	Small sample size, observational, missing some controls	

Child Care Ratios											
Title	Author(s)	Year	Publication Source	Sample Size (N)	Sample Composition	Data Source	Independent Variable(s)	Dependent Variable(s)	Summary of Findings	Limitations to Causal Inference	Exclusion Criteria
Children's experiences in center-based child care as a function of teacher background and adult:child ratio	Howes, C.	1997	<i>Merrill-Palmer Quarterly</i>	760, 820	760 children in 635 classrooms (Cost, Quality, and Outcome Study dataset) & 820 children in 410 classrooms (Florida Quality Study)	Classroom Interaction Scale, Adult Involvement Scale, Peabody Picture Vocabulary Test, Woodcock-Johnson Tests of Achievement, Classroom Behavior Inventory	<ul style="list-style-type: none"> Teachers' education/training and binary met/did not meet professional recommendations for ratios 	<ul style="list-style-type: none"> Teaching behavior in the classroom Children's activities in classroom 	<ul style="list-style-type: none"> The study found that teacher's background (training and education) were associated with improved teaching practices and children's activities. 	Observational	
Thresholds of quality: Implications for the social development of children in center-based child care	Howes, C., Phillips, D., Whitebook, M.	1992	<i>Child Development</i>	414	414 children (ages 14 months to 54 months) enrolled in care in southern California and Atlanta, Georgia for at least 20 hours per week	Early Childhood Environmental Rating Scale, and Infant-Toddler Environmental Rating Scale, Waters and Deane Attachment Q-Set	<ul style="list-style-type: none"> Child to caregiver ratio Group size 	<ul style="list-style-type: none"> ECERS & ITERS (process quality) Deane Q-Set (attachment) Social orientation Interaction with peers 	<ul style="list-style-type: none"> The study found that meeting ratio requirements was significantly associated with appropriate caregiving and developmentally appropriate activities (process measures), which were in turn associated with children's relationships and social competence with their peers (outcome measures). However, the relationship between ratios and the outcome measures was not statistically significant. 	Descriptive, did not control for family characteristics	
Determinants of toddlers' experience in day care: Age of entry and quality of setting	Howes, C., Rubenstein, J.	1985	<i>Child Care Quarterly</i>	78	78 toddlers enrolled in center or family day care or at home with their mothers	Observations by trained staff	<ul style="list-style-type: none"> Child to caregiver ratio 	<ul style="list-style-type: none"> Caregiver-child interactions 	<ul style="list-style-type: none"> Children in day care settings with more adults per child had higher talk and play scores, lower restrict and cry scores, and higher touch and laugh scores than settings with fewer adults per child. The analysis divided the day care sample of children into two groups based on the median adult-child ratio, which was 1:3. 	Small sample size; observational	
Child care quality, compliance with regulations, and children's development: The Pennsylvania Study	Kontos, S., Fiene, R.	1987	Book chapter in <i>Quality in Child Care: What Does Research Tell Us</i>	100	100 children at 10 child care centers randomly selected from among 350 centers in the northeast region of Pennsylvania	Child Development Program Evaluation Scale, Caregiver Observation Form and Scale, ECERS	<ul style="list-style-type: none"> Staff turnover Center capacity Ratios Group size Director's experience Average staff experience Staff with 4 year degrees 	<ul style="list-style-type: none"> Intellectual development Language development Social development Child care quality (ECERS) 	<ul style="list-style-type: none"> Center capacity, group size, and ratio were most consistently related to quality. Larger center capacity and more children per caregiver predicted lower ECERS quality scores (however, no p-values were reported for this analysis). Ratios did not have a statistically significant relationship to any of the child development outcomes measured. Center quality (as measured by ECERS score) did not predict children's development when child age, family background, and child care history were accounted for. 		Preschoolers only
Differences in child care quality in rural and non-rural areas	Maher, E., Frestedt, B., Grace, C.	2008	<i>Journal of Research in Rural Education</i>	1,349	Representative sample of households in 5 states (951 families using center care & 398 families using family care)	Telephone interviews and dataset from previous project: Financing Universal Early Care and Education for America's Children project	<ul style="list-style-type: none"> Rural/urban Family characteristics Subsidy receipt Child care cost 	<ul style="list-style-type: none"> Ratios 	<ul style="list-style-type: none"> The study found that infants in centers in rural areas were more likely to experience higher child-adult ratios than non-rural counterparts. Not significant for toddlers and pre-schoolers. In rural areas, the cost of care (center and home-based) was associated with lower ratios for the toddler group only. 		Ratios were the dependent variable, not the independent variable

Child Care Ratios											
Title	Author(s)	Year	Publication Source	Sample Size (N)	Sample Composition	Data Source	Independent Variable(s)	Dependent Variable(s)	Summary of Findings	Limitations to Causal Inference	Exclusion Criteria
Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills	Mashburn, A., Pianta, R., Hamre, B., Downer, J., Barbarin, O., Bryant, D., Burchinal, M., Early, D., Howes, C.	2008	<i>Child Development</i>	2,439 children in 671 pre-K classrooms in 11 states	States were chosen specifically because their programs were operationally stable and mature, had been in existence for a number of years, and because they served a large number of the 4-year-old population in their states.	ECERS, CLASS	• Child care quality	• Academic skills • Language skills • Social skills	• The study found no statistically significant relationship between ratios and outcomes. It did find significant associations between the quality of the teacher's instructional interactions and children's academic and language skills.		Pre-K, not toddlers
Child care and common communicable illnesses	National Institute of Child Health and Human Development Study of Early Child Care	2001	<i>Archives of Pediatric and Adolescent Medicine</i>	1,200	Families participating in this study were recruited through mothers' hospital visits that were made shortly after the birth of a child during the calendar year 1991. Children from 10 sites were recruited if the mother was healthy, over age 18, spoke English, not a multiples birth, and lived in relatively safe neighborhood, living within an hour of the study's host university.	NICHD SEEC dataset; Home Observation for Measurement of the Environment Inventory; Child Illness Histories (parent-reported); Bracken Basic Concept Scales and Reynell Developmental Language Scales; Child Behavioral Checklist	• Child care type • Hours	• Incidence of illness • School readiness • Language competence • Behavioral problems	• The study found a significant association between attending nonmaternal child care and rates of illness for ages 0-2, but the association was not significant by age 3. Hours in child care and group size during the first year were predictive of the rate of illness (for respiratory illnesses).		
Child outcomes when child care classes meet recommended standards for quality	NICHD Early Child Care Research Network	1999	<i>American Journal of Public Health</i>	97-250 children, 24 and 36 months old (NICHD dataset)	Children from 10 sites were recruited if the mother was healthy, over age 18, spoke English, child was not a multiples birth, and lived in a relatively safe neighborhood, living within an hour of the study's host university.	NICHD dataset; Observational Record of the Caregiving Environment; Bayley Mental Development Index; Reynell Developmental Language Scales	• Number of standards met for American Public Health Association and American Academy of Pediatrics standards for ratios • Group sizes • Caregiver training • Caregiver education	• Cognitive development • School readiness • Expressive language • Language comprehension • Behavior problems • Positive social behavior	• Classrooms that met more standards related to ratios, group sizes, education, and training saw a decrease in behavior problems at 24 months. Meeting more standards also predicted school readiness, language skills, and decreased behavior problems. However, the study did not disaggregate findings for the individual standards (i.e. examining the precise effects of ratios or group size.)		Does not disaggregate effects of ratios
Characteristics and quality of child care for toddlers and preschoolers	NICHD Early Child Care Research Network	2000	<i>Applied Developmental Science</i>	612-674 children, 15-36 months old (NICHD Study of Early Child Care (SECC) dataset)	Children from 10 sites were recruited if the mother was healthy, over age 18, spoke English, child was not a multiples birth, and lived in a relatively safe neighborhood, living within an hour of the study's host university.	NICHD SECC Dataset; Observational Record of the Caregiving Environment	• Group size • Child to caregiver ratios • Type of care arrangement • Caregiver beliefs • Caregiver education/training • Caregiver experience • Physical environment	• Quality Scale: ORCE (Observational Record of the Caregiving Environment) • Overall care rating	• The study found that lower group sizes and ratios were predictive of more positive caregiving and overall process quality for infants; for preschoolers, caregiver education and training were stronger predictors.	Longitudinal study but data were analyzed in a cross-sectional, correlational manner for this study [participants not necessarily the same at each age point analyzed]	

Child Care Ratios											
Title	Author(s)	Year	Publication Source	Sample Size (N)	Sample Composition	Data Source	Independent Variable(s)	Dependent Variable(s)	Summary of Findings	Limitations to Causal Inference	Exclusion Criteria
Child-care structure --> process --> outcome: Direct and indirect effects of child-care quality on young children's development	NICHD Early Child Care Research Network	2002	<i>Psychological Science</i>	813 children at age 54 months in child care centers (NICHD SECC dataset)	Children from 10 sites were recruited if the mother was healthy, over age 18, spoke English, child was not a multiples birth, and lived in relatively safe neighborhood, living within an hour of the study's host university.	NICHD Study of Early Child Care	<ul style="list-style-type: none"> Caregiver training Child to caregiver ratio 	<ul style="list-style-type: none"> Cognitive competence (composite) Social competence (mother and caregiver assessments) 	<ul style="list-style-type: none"> The study found that the quality of maternal caregiving was the strongest predictor of children's cognitive competence. The study found a mediated association (not direct or causal) from caregiver training and child-staff ratio through quality of nonmaternal caregiving to cognitive and social competence of children. 	No infants/toddlers ; the study was longitudinal but this particular analysis only analyzed 1 time point: at 54 months old (cross-sectional analysis)	
Characteristics of infant child care: Factors contributing to positive caregiving	NICHD ECCRN	1996	<i>Early Childhood Research Quarterly</i>	576	576 children (NICHD SEEC dataset) ages 6 months	NICHD dataset surveys, observations	<ul style="list-style-type: none"> Child to caregiver ratio Group size Child care type 	<ul style="list-style-type: none"> Caregiver behavior (ORCE) Observational Record of the Caregiving Environment 	<ul style="list-style-type: none"> The study found that lower ratios and smaller group sizes were overall associated with more positive caregiving and more frequent interactions with children. A one child increase in the child-adult ratio was associated with a decline of 0.22 in average rating and 0.28 in frequency of positive caregiving. Ratios were highest in centers compared to other types of settings, and centers were the only setting that did not see a statistically significant relationship between ratios and quality of caregiving. 	Cross-sectional	
Child-caregiver ratios in day care center groups: Impact on verbal interactions	Palmerus, K.	1996	Early Child Development and Care	34	Day care centers in Sweden with children ages 1-7	Earlier study and additional data collections - observations of child interactions	<ul style="list-style-type: none"> High ($\geq 4:1$) or low ($\leq 2:1$) child to caregiver ratio 	<ul style="list-style-type: none"> Child-initiated verbal activities Verbal interaction between caregivers 	<ul style="list-style-type: none"> Children in settings with higher ratios (more children) initiated fewer verbal interactions whereas the adults initiated more of the interactions. 	Small sample size	Geography may not be representative (not US)
Child-staff ratios in early childhood education and care settings and child outcomes: A systematic review and meta-analysis	Perlman, M., Fletcher, B., Falenchuk, O., Brunsek, A., McMullen, E., Shah, P.	2017	<i>PLoS One</i>	3 studies	29 studies (3 included in meta-analysis) reporting associations in cohort, cross-sectional, or longitudinal analyses	Online databases: PsycINFO, Medline, ERIC	<ul style="list-style-type: none"> Child to caregiver ratio 	<ul style="list-style-type: none"> Child's receptive language 	<ul style="list-style-type: none"> The authors were only able to use 3 of the studies in the meta-analysis (out of the 29 in the systematic review). The results of the meta-analysis reviewing the association between ratios and receptive language were not significant. 		Only used 3 studies in the meta-analysis; was international; included cross-sectional studies; preschool-age children
The social policy context of child care: Effects on quality	Phillips, D., Howes, C., Whitebook, M.	1992	<i>American Journal of Community Psychology</i>	227	227 child care centers in 5 metro areas	Lists of licensed child care centers, observations using Early Childhood Environment Rating Scale	<ul style="list-style-type: none"> FIDCR (Federal Interagency Day Care Requirements) compliance 	<ul style="list-style-type: none"> Quality of care 	<ul style="list-style-type: none"> Centers in states with more stringent child care regulations tended to better comply with FIDCR regulatory benchmarks for ratio, group size, and training. Centers who more fully complied with the provisions had lower staff turnover rates, more age-appropriate classroom activities, less harsh and more sensitive teacher behaviors, and more teachers with specialized training. The ratios for child care centers were lower in states with more stringent ratio regulations. 		Does not disaggregate effects of ratios

Child Care Ratios											
Title	Author(s)	Year	Publication Source	Sample Size (N)	Sample Composition	Data Source	Independent Variable(s)	Dependent Variable(s)	Summary of Findings	Limitations to Causal Inference	Exclusion Criteria
Within and beyond the classroom door: Assessing quality in child care centers	Phillips, D., Mekos, D., Scarr, S., McCartney, K., Abbott-Shim, M.	2000	<i>Early Childhood Research Quarterly</i>	104 child care centers (98 infant rooms, 112 toddler rooms, and 106 pre-k rooms)	Centers were considered eligible to participate if they enrolled children from 12 to 60 months and received no more than 30% of their income from federal, state, or local subsidy programs	Drawn from a multisite project conducted in 1988 through 1989; comprehensive lists of licensed or registered centers in each state provided the sampling frame for the study; ITERS & ECERS	<ul style="list-style-type: none"> Ratio compliance Child to caregiver ratio Group size Teacher education Teacher training Highest wage Parent fees 	<ul style="list-style-type: none"> ECERS ITERS Assessment Profile 	<ul style="list-style-type: none"> The study found that higher classroom quality was significantly predicted by higher parent fees, smaller group sizes, lower child-teacher ratios, and better teacher training and education. Ratios were stronger predictors of quality for infants than toddlers or preschoolers. 	All data collected in the 1980s; sites may not be representative of other child care settings. Observational	
The prediction of process quality from structural features of child care	Phillipsen, L., Burchinal, M., Howes, C., Cryer, D.	1997	<i>Early Childhood Research Quarterly</i>	121 infant/toddler classrooms, 370 preschool classrooms; n for individual children was not given.	224 infant/toddler and 509 pre-k classrooms (From Cost, Quality, Outcomes - CQO Study dataset) were sampled. Complete data were not able to be collected from all classrooms.	Cost, Quality, Outcomes Study data (ECERS, ITERS, Caregiver Interaction Scale, Teacher Interaction Scale)	<ul style="list-style-type: none"> Child to caregiver ratio Teacher education Teacher experience Teacher wage 	<ul style="list-style-type: none"> Quality scales including the ECERS, ITERS, CIS, & TIS (process quality) 	<ul style="list-style-type: none"> The study found that classroom process quality was higher in states with stricter child care regulations. In infant/toddler classrooms, process quality was higher with more experienced staff and higher wages. Lower ratios were weaker predictors than teacher wages for process quality. The overall process quality for infant/toddler classrooms was low and, on average, rated lower than pre-k classrooms. 	Only 102 infant/toddler classrooms had complete data and most missing data is for ratios. Observational design.	
Features of pre-kindergarten programs, classrooms, and teachers: Do they predict observed classroom quality and child-teacher interactions?	Pianta, R., Howes, C., Burchinal, M., Bryant, S., Clifford, R., Early, D., Barbarin, O.	2005	<i>Applied Developmental Science</i>	224 classrooms for the ratios study (see Table 1, p. 149 of study)	238 classrooms in 6 states; More detail from study: "All were serving more than 15% of their 4-year-old children in state-funded pre-kindergarten programs. States were selected to maximize diversity with regard to geography, program location (in a public school building or not), program length (full-day vs. part-day programs, using a cut point of 3.5 hr per day), and educational requirements for teachers." (p. 148).	National Center for Early Development and Learning's Multi-State Pre-Kindergarten Study; ECERS, CLASS, teachers' beliefs measured with the Modernity Scale, teachers' mental health assessed using the Center for Epidemiological Studies Depression Scale	<ul style="list-style-type: none"> Child to caregiver ratio 	<ul style="list-style-type: none"> Quality of day care environment Quality of day care interactions 	<ul style="list-style-type: none"> Ratios were not found to have any significant association with any quality measures. 		No infants/toddlers
Final report of the National Day Care Study	Ruopp, R.	1979	Prepared for US Administration for Children and Families	64 day care centers, 1600 children	64 day care centers in low-income areas in Atlanta, Detroit, and Seattle	Observational, assessments (PPVT, PSI, SRI Fine and Gross Motor Tests, Pupil Observation Checklist)	<ul style="list-style-type: none"> Group size Number of caregivers Ratio Caregiver qualifications 	<ul style="list-style-type: none"> Child cognitive outcomes (using PPVT and Preschool Inventory) Process quality Cost variables 	<ul style="list-style-type: none"> Child to caregiver ratio was associated with better child outcomes for toddlers but not preschoolers. However, group size was a stronger predictor than ratios of child test scores and social engagement. Children did not appear to have more one-on-one interactions with adults when the child to caregiver ratio was low 	Older study; examined 3 cities that were not randomly selected; did not deal with self-selection, unmeasured center characteristics.	

Child Care Ratios											
Title	Author(s)	Year	Publication Source	Sample Size (N)	Sample Composition	Data Source	Independent Variable(s)	Dependent Variable(s)	Summary of Findings	Limitations to Causal Inference	Exclusion Criteria
The quality of toddler child care and cognitive skills at 24 months: Propensity score analysis results from the ECLS-B	Ruzek, E., Burchinal, M., Farkas, G., Duncan, G.	2014	<i>Early Childhood Research Quarterly</i>	8,350	A nationally representative, longitudinal cohort study of US children born in 2001	Early Childhood Longitudinal Study - Birth Cohort, Bayley Scores, Maternal Sensitivity scores (Nursing Child Assessment Teaching Scale)	• Child care quality	• 24 month Bayley mental scores	• The study examined how child care type, quantity, and quality were associated with children's cognitive scores, as measured by the Bayley scale, at 24 months. The authors found that scores were higher in medium and high quality care than in low quality care. Type and quantity of care did not show significant associations with cognitive scores.		Did not look at ratios
Measurement of quality in child care centers	Scarr, S., Eisenberg, M., Deater-Deckard, K.	1994	<i>Early Childhood Research Quarterly</i>	363	363 classrooms (infants, toddlers, and pre-k) in 120 child care centers	Lists of state licensed or registered child care centers; observations using ITERS, ECERS, and Assessment Profile for Early Childhood Programs	• Child to caregiver ratio • Group size • Teacher education • Teacher training in child development • Teacher wage • Staff turnover	• Process quality (ECERS and ITERS scales)	• Only teachers' wages were found to be significantly associated with classroom process quality. Ratios, group size, and staff turnover were not significantly associated with quality.	Observational	
Associations between structural quality aspects and process quality in Dutch early childhood education and care settings	Slot, P., Leseman, P., Verhagen, J., Mulder, H.	2015	<i>Early Childhood Research Quarterly</i>	276 classrooms and 375 teachers	Sample from the ongoing national cohort study pre-COOL, which investigates the effectiveness of preschool education and care in the Netherlands	CLASS, Emotional Quality and Educational Quality, using observational measures and teacher reports	• Group size • Child to caregiver ratios • Education program • Teacher's education • Professional development • Type of care	• Process quality (CLASS and self reported teacher behavior)	• The study found that group size and ratios were not significantly related to process quality, but teacher education did have a small, positive association with process quality in the emotional domain. The strongest element was the teacher's frequency of professional development.		Netherlands